

Notice of Allowability	Application No.	Applicant(s)	
	09/991,692	KAGAN ET AL.	
	Examiner	Art Unit	
	KENNETH TANG	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Amendment on 11/18/08 and the Examiner's Amendment on 1/13/09.
2. ☒ The allowed claim(s) is/are 1-7, 10, 13-22, 25, and 28-30; now renumbered as 1-22.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. <input type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date ____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>1/13/09</u> . 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other ____. |
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EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Dr. Alan Rosenthal on 1/13/09.

The claims in the application has been amended as follows:

1. (Currently Amended) A method for controlling access by processes running on a host device to a communication network, the method comprising:

assigning to each of the processes a single respective doorbell address in an address range, in an address space of the host device, occupied by a network interface adapter that couples the host device to the network;

by a driver of the network interface adapter, allocating a plurality of instances of a communication service on the network, to be provided via the adapter, to at least some of the processes on the host device, such that each of the instances is allocated to a particular one of the processes, wherein allocating the instances comprises allocating multiple instances to a single one of the processes;

by the network interface adapter, receiving a request submitted by a given one of the processes to its respective doorbell address, to access one of the allocated service instances, which is specified in the request; and

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conveying data over the network using the specified instance of the service, subject to verifying, based on the doorbell address to which the request was submitted, that the specified instance was allocated to the given process;

wherein the communication service comprises a transport service, wherein allocating the plurality of the instances comprises allocating pairs of work queues, and wherein receiving the request comprises receiving a work request to place a work item in a specified one of the work queues, and wherein conveying the data comprises transporting the data to a destination address provided by a context of the specified work queue.

2. (Previously Presented) A method according to claim 1, wherein assigning the respective doorbell address comprises assigning a single page in the address space of the host device to each of the processes for use thereby as the respective doorbell.

3. (Previously Presented) A method according to claim 1, wherein conveying the data comprises verifying that the specified service instance is one of the multiple instances allocated to the single one of the processes.

4. (Original) A method according to claim 1, wherein allocating the instances comprises recording a context of each of the instances in a table accessible to the network interface adapter, the context in the table indicating the respective doorbell address of the process to which each of the instances is allocated, and wherein conveying the data comprises verifying that the doorbell

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address to which the request was submitted matches the doorbell address indicated by the table for the specified instance.

5. (Original) A method according to claim 4, wherein recording the context comprises maintaining the table in a memory accessible to the host device, while preventing access by the processes to the table.

6. (Original) A method according to claim 4, wherein the context further comprises at least a destination address and service type for each of the instances.

7. (Original) A method according to claim 1, wherein assigning the respective doorbell address comprises assigning the address using an operating system running on the host device, and wherein receiving the request comprises receiving the request by the given process to write to its respective doorbell address by means of the operating system, which permits each of the processes to write only to its own assigned doorbell address.

8-9. (Canceled)

10. (Currently Amended) A method for controlling access by a process on a host device to a communication network, the method comprising:

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allocating to the process a plurality of pairs of work queues on a channel adapter that couples the host device to the network, for use by the process in sending and receiving communications over the network;

assigning to the process a single doorbell address, in an address range occupied by the adapter in an address space of the host device, for use in accessing any of the plurality of the pairs of work queues;

receiving a work request submitted by the process to the doorbell address to place a work item in one of the allocated queues that is specified in the request; and

transporting data over the network responsive to the work request;

wherein transporting the data comprises verifying, based on the doorbell address to which the request was submitted, that the queue specified in the request was allocated to the process, wherein allocating the plurality of pairs of work queues comprises allocating the pairs of work queues to multiple processes on the host device, such that each of the pairs is allocated to a particular one of the processes, and wherein assigning the single doorbell address comprises assigning multiple, respective doorbell addresses to the multiple processes.

11-12. (Canceled)

13. (Currently Amended) A method according to claim ~~[[12]]~~10, wherein assigning the multiple doorbell addresses comprises assigning a single page in the address space of the host device to each of the processes for use by the processes as the respective doorbell addresses.

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14. (Currently Amended) A method according to claim ~~[[12]]~~10, wherein assigning the multiple doorbell addresses comprises assigning the addresses using an operating system running on the host device, and wherein receiving the work request comprises receiving the request submitted by the process by means of the operating system, which permits each of the processes to write only to its own assigned doorbell address.

15. (Original) A method according to claim 10, wherein allocating the pairs of work queues comprises recording a context of each of the pairs in a table accessible to the channel adapter, the context in the table indicating the respective doorbell address of the process to which each of the pairs is allocated, and wherein transporting the data comprises verifying that the doorbell address to which the request was submitted matches the doorbell address indicated by the table for the specified queue.

16. (Currently Amended) A network interface adapter, for coupling a host device to a communication network, the adapter comprising:

a range of doorbell addresses in an address range occupied by the channel adapter in an address space of the host device, such that each of a plurality of processes running on the host device is assigned a single respective doorbell address within the range; and

a hardware controller, which is arranged to allocate a plurality of instances of a communication service provided by the adapter on the network to at least some of the processes on the host device, such that each of the instances is allocated to a particular one of the processes, wherein multiple instances of the service may be allocated to a single one of the

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processes, and which is further arranged, when the adapter receives a request submitted by a given one of the processes to its respective doorbell address to access one of the allocated service instances specified in the request, to verify, based on the doorbell address to which the request was submitted, that the specified instance was allocated to the given process before allowing the adapter, in response to the request, to convey data over the network using the specified instance of the service;

wherein the communication service comprises a transport service, wherein the instances comprise pairs of work queues, and wherein the request causes a work item to be placed in a specified one of the work queues, whereupon the adapter transports the data to a destination address provided by a context of the specified work queue.

17. (Previously Presented) An adapter according to claim 16, wherein the respective doorbell address comprises a single page in the address space of the host device, which is assigned respectively to each of the processes.

18. (Previously Presented) An adapter according to claim 16, wherein the controller is arranged to verify that the specified service instance is one of the multiple instances allocated to the single one of the processes.

19. (Original) An adapter according to claim 16, wherein the controller is arranged to record a context of each of the instances in a table, the context in the table indicating the respective doorbell address of the process to which each of the instances is allocated, and to verify that the

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doorbell address to which the request was submitted matches the doorbell address indicated by the table for the specified instance.

20. (Original) An adapter according to claim 19, wherein the table is maintained in a memory accessible to the host device, while the processes are prevented from accessing the table.

21. (Original) An adapter according to claim 19, wherein the context further comprises at least a destination address and service type for each of the instances.

22. (Original) An adapter according to claim 16, wherein the doorbell address is assigned using an operating system running on the host device, which permits each of the processes to write only to its own assigned doorbell address.

23-24. (Canceled)

25. (Currently Amended) A channel adapter for coupling a host device to a communication network, the adapter comprising:

a plurality of pairs of work queues, for allocation to a process on the host device for use in sending and receiving communications over the network; **[[and]]**

a single doorbell address in an address range occupied by the channel adapter in an address space of the host device, for assignment to the process for use in accessing any of the plurality of the pairs of work queues, so that in response to a work request submitted by the

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process to the single doorbell address to place a work item in one of the allocated queues that is specified in the request, data are transported over the network by the adapter; and

a hardware controller, which is arranged to verify, based on the doorbell address to which the request was submitted, that the queue specified in the request was allocated to the process before allowing the data to be transported by the adapter;

wherein the plurality of pairs of work queues are allocated to multiple processes on the host device, such that each of the pairs is allocated to a particular one of the processes, and wherein multiple, respective doorbell addresses are assigned to the multiple processes.

26-27. (Canceled)

28. (Currently Amended) An adapter according to claim ~~[[27]]~~25, wherein each of the doorbell addresses comprises a single page in the address space of the host device.

29. (Currently Amended) An adapter according to claim ~~[[27]]~~25, wherein the multiple doorbell addresses are assigned using an operating system running on the host device, and wherein the work request is submitted by the process by means of the operating system, which permits each of the processes to write only to its own assigned doorbell address.

30. (Original) An adapter according to claim 25, and comprising a controller, which is arranged to record a context of each of the pairs in a table accessible to the channel adapter, the context in the table indicating the respective doorbell address of the process to which each of the

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pairs is allocated, and to verify that the doorbell address to which the request was submitted matches the doorbell address indicated by the table for the specified queue before allowing the data to be transported by the adapter.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KENNETH TANG whose telephone number is (571)272-3772.

The examiner can normally be reached on 8:30AM - 6:00PM, Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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